Geophysical Research Abstracts,
Vol. 10, EGU2008-A-10344, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-10344
EGU General Assembly 2008

The implication of accelerated greenhouse effects on Alaskan glaciers, Juneau Icefield - 1946-2007

M. M. Miller (1), and B. F. Molnia (2)

(1) Glaciological and Arctic Sciences Institute, University of Idaho, P.O. Box 44302, Moscow, ID 83844-3022, USA, (2) USGS, Earth Surface Processes, 926A National Center, Reston, VA 20192, USA, (bmolnia@usgs.gov, 703-648-6953)

Annual glacier regime records from Alaska's Juneau Icefield provide a valuable base for assessing global warming effects. The Juneau Icefield is the fifth largest in the western hemisphere and has been the focus of mass balance measurements since 1946 by the Juneau Icefield Research Program (JIRP). Since the 1950's, JIRP has documented down-wasting of the Herbert, Mendenhall, Lemon Creek, Twin, Lewellyn and Cathedral Massif Glaciers; and the contrasting thickening and advance of the Taku Glacier, the icefield's largest glacial system.

Covering an area of 310 square kilometers, Taku Glacier has experienced continuous growth since 1890 and is now one of less than a dozen large coastal Alaskan glaciers having a positive regime. Taku Glacier's main névé zone at depth is glaciothermally temperate, reflecting ice flow velocities and variations derived solely from accumulation load changes. JIRP's research of the Taku Glacier has focused on measurement of annual mass balance, GPS surveys of surface flow, and recording ELA.

Over the past 30 years these data have revealed that minimum annual temperatures in the central icefield sector have risen from a mean of -30 degrees C to -10 degrees C. This remarkable change is allied to what is now recognized as a pronounced inland shift of the Arctic Front, along with a coinciding upward shift in the atmospheric freezing level and a parallel rise in the mean late-summer névé line. These measurements are consistent with atmospheric warming effects which have strongly influenced the melting of sea-ice in the Arctic Ocean, and the nearly complete loss of summer pack

ice at the North Pole.